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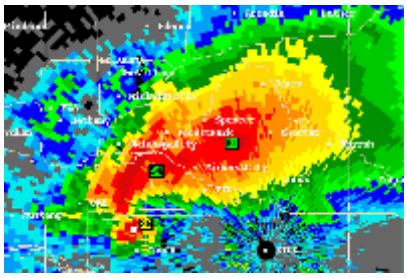
The National Severe Storms Laboratory

Studying devastating storms in the heart of "tornado alley"

Experimental weather balloons are used to study the electrical structure of thunderstorms.

NSSL is dedicated to the study of all types of severe weather, including lightning



NWS forecasters track storms using NSSL technology

The first of many strong tornadoes strikes central Oklahoma on May 3, 1999.

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What does the National Severe Storms Laboratory do for the nation?

The National Severe Storms Laboratory (NSSL) leads the way in investigations of all aspects of severe and hazardous weather. Headquartered in Norman, Oklahoma, with staff in Colorado, Nevada, Washington, Utah, and Wisconsin, the people of NSSL, in close partnership with the National Weather Service, are dedicated to improving the lead time and accuracy of severe weather warnings and forecasts in order to save lives and reduce property damage.

Severe weather research conducted at NSSL has led to substantial improvements in both severe and hazardous weather forecasting resulting in increased warning lead times to the public. NSSL scientists are exploring new ways to improve our understanding of the causes of severe weather and ways to use weather information to assist National Weather Service (NWS) forecasters, as well as Federal, university and private sector partners.

Recent Accomplishments:

- Scientists from NSSL recently completed two field experiments to study severe and hazardous weather. IPEX, the Intermountain Precipitation Experiment, was designed to improve forecasts of winter weather, especially in the high population growth areas of the western United States. STEPS, the Severe Thunderstorm Electrification and Precipitation Study, focused a number of data gathering tools on thunderstorms in the high plains to better understand how rain and lightning are formed. ***Payoffs: The knowledge gained through these field programs conducted by NSSL scientists will lead to better forecasts of deadly weather phenomenon including tornadoes, lightning, hail, flash floods, snowstorms and freezing rain.***

- NSSL continues to be a pioneer in the development of weather radar. NSSL is presently researching the use of dual polarization radar to improve precipitation measurements and hail identification. This improvement to the current NEXRAD Doppler radar technology provides more information about precipitation in clouds to better distinguish between rain, ice, hail and mixtures. ***Payoffs: Such information will help forecasters provide better warnings for flash floods, the number one severe weather threat to human life.***

- NSSL is committed to incorporating cutting edge scientific understanding of severe weather signatures in radar data into tools designed to help National Weather Service forecasters make better and faster warning decisions. The latest tool, NSSL's Warning Decision Support System-II, includes automated algorithm detection tools for the NEXRAD Doppler radar to identify rotation in storms preceding tornadoes, likelihood and size of hail, as well as simply identifying and tracking storms. This information is presented in an easy to use display including tables, graphs and data

interrogation tools. ***Payoffs: Several of these tools have already been integrated into the National Weather Service's systems and have contributed to improved warning lead times with fewer false alarms.***

- NSSL is working directly with the National Weather Service to change the operating system for the NEXRAD Doppler radar from a proprietary computer platform to a UNIX based open systems platform. ***Payoffs: This increases the radar's flexibility, extending its life and dramatically lowering maintenance and upgrade costs.***

What's next for NSSL?

NSSL researchers will soon begin adapting state-of-the-art radar technology currently deployed on Navy ships for use in spotting severe weather. Phased-array radar reduces the scan or data collection time from six minutes to only one minute, potentially increasing the average lead time for tornado warnings from 12 minutes to 17 minutes. When combined with other technology being developed at NSSL, warning lead times may be extended to an unprecedented 22 minutes.

NSSL has a unique opportunity to combine facilities with the National Weather Service and several key university weather organizations also focused on severe weather research. Planning is underway for the proposed National Weather Center, a new $60 million facility that will become the premier severe weather research and forecasting complex in the world. The new building will increase collaboration and communication for the weather researchers and forecasters engaged in complimentary efforts toward better forecasts and warnings of severe and hazardous weather.

NSSL has also begun working on ways to improve short-term weather forecasting computer models for the National Weather Service, basic tornado research to understand how tornadoes form, and realtime delivery of radar data to the public via the Internet. In addition, NSSL researchers continue to strive for an improved understanding of tornadoes and other severe weather by creating new tools such as mobile Doppler radars employing the latest technology and by deploying radio-controlled aircraft carrying weather instruments into and around storms.

Research Partnerships:

NSSL has a research partnership with the Cooperative Institute for Mesoscale Meteorological Studies (CIMMS), a cooperative institute between NOAA and the University of Oklahoma. Additionally, NSSL has research partnerships with the U.S. Navy, Air Force, Department of Transportation, Federal Aviation Administration, and several large and small corporations.

Budget and Staff:

NSSL is a $15 million laboratory ($5.5 million in NOAA base), with 142 employees, including 50 federal employees and 92 university employees.

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